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which is easily verified to agree with the previous result. The corresponding double root is then found to be

$$(11) \quad x_0 = \frac{c_0^{1/3}}{2} [(a+b)^{2/3} - (a-b)^{2/3}] = \sqrt{\frac{a^2 + b^2 - c_0^2}{3}} = \frac{6abc_0}{a^2 + b^2 + 8c_0^2}.$$

The remaining two roots are obtained by adding to the negative of the double root

$$(12) \quad \pm \sqrt{\frac{a^2 + b^2 + 8c_0^2}{3}}.$$

The maximum value of $f(x)$ at $x = (x_0/c_0)c$ will be found to be

$$(13) \quad 2 \left[1 - \frac{c_0^2}{c^2} \right],$$

and it gives the same results as the discriminant and in a much more evident form. This shows that the first two positive roots are separated by $(x_0/c_0)c$.

In Osgood's *Calculus*, page 404, is given a solution of the case $a = 15$, $b = 10$, $c = 1$. Here $c_0 = 13.741$, $x_0 = 6.738$, and since $a^2/b^2 = 2.25 > 6\sqrt{3} - 9$ this example falls in II2 and there is only one inscribed rectangle. If $c = 13$ there is no inscribed rectangle. If $c = 14$ there are two inscribed rectangles, one having the side 5. + and the other the side 8. +.

II. NOTE ON THE PRECEDING BY H. P. MANNING, Brown University.

There is no particular distinction between the sides c and x of the inscribed rectangle. We can call them x and y , and equation (3) or (3') will then be represented by a curve of the fourth degree in which many of the results of the above discussion appear graphically.

Moreover, m and n satisfy the equation $m^2 - n^2 = am - bn$, and so are represented by the points of an equilateral hyperbola, which passes through the vertices of the given rectangle if we lay off m and n from its lower left-hand corner.

273 (Number Theory) [1917, 427]. Proposed by V. M. SPUNAR, Chicago, Ill.

The ratio of the chances that all numbers ending in 1 or 9 and those ending in 3 or 7 are composite is $3 : 2^4$.

NOTE BY NORMAN ANNING, University of Maine.

Since

$$\begin{aligned} 1 \times 1 &\equiv 3 \times 7 \equiv 9 \times 9 \equiv 1 \pmod{10}, & 1 \times 3 &\equiv 7 \times 9 &\equiv 3 \pmod{10}, \\ 1 \times 7 &\equiv 3 \times 9 &\equiv 7 \pmod{10}, & 1 \times 9 &\equiv 3 \times 3 \equiv 7 \times 7 \equiv 9 \pmod{10}, \end{aligned}$$

the conclusion might be drawn that in the long run as many primes end in 1 as in 9 and as many end in 3 as in 7 and that there would be more of the latter than of the former. A census of primes taken over a considerable range supports these statements but does not point towards the ratio "3 : 2." Counting cases up to 3,200, a number chosen at random, shows the following results:

110 primes end in 1, 113 in 3, 116 in 7 and 111 in 9.

Since these numbers are so nearly in equilibrium and since primes are so perfectly lawless no statement could be hazarded about the distribution in a larger interval.

2728 [1918, 397]. Proposed by NORMAN ANNING, University of Maine.

A material triangle of uniform density and thickness is of such a shape that when suspended from the vertices in succession, the lower sides have slopes of $1 : 1$, $1\frac{1}{2} : 1$, and $3 : 1$. Construct the triangle given that the shortest side is 10 inches.

By definition, an $a : 1$ slope makes an angle with the vertical whose tangent is a .

¹The enunciation of the problem is not clear. The chance that all numbers ending in 1 or 9 are composite numbers is zero. — EDITORS.